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ABSTRACT
                Project TTAP (Technology Team Assessment Process)
demonstrated a functional technology assessment model that can be
used to ensure that children from birth to 8 with moderate to severe
disabilities receive a thorough team assessment and follow-up
consultation focused on individualized technology applications.
Team-based procedures were developed to assess children to determine
appropriate technology applications. The TTAP Core Team optimally
includes an early intervention specialist, a technology specialist, a
communication specialist, a physical therapist and/or occupational
therapist, and a family representative. Each child assessed has a
Support Team made up of his or her family and representatives of
early intervention services and cooperating agencies. A TTAP
assessment is based on careful observation and analysis of the
child's behavior in typical settings as well as during the
assessment, and can be conducted in the home, the classroom, or in
another setting. Recommendations are made for applications and
equipment that would benefit the child and his/her family. Follow-up
consultation, technology training for the child's Support Team, and
re-assessment are included. This final report outlines project goals
and objectives, a theoretical framework, description of the model and
participants, problems and solutions, evaluation findings, and
project effectiveness and dissemination activities. An appendix
contains TTAP procedures and forms for technology assessment for
computer capability for the education of special students. (JDD)

Technology Team Assessment Process

Final Report

Early Education Program for Children with Disabilities
United States Department of Education
Project Number HO24B90038
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Project TTAP: Technology Team Assessment Process

Abstract

Overview. The major goal met by Project TTAP (Technology Team Assessment Process), housed in Macomb Projects in the College of Education at Western Illinois University, was to demonstrate a functional technology assessment model which can be used to ensure that children from birth to 8 with moderate to severe disabilities receive a thorough team assessment and follow-up consultation focused on individualized technology applications. Children who participate in TTAP assessments demonstrate disabilities which prevent them from interacting effectively with people, objects, and events in their environment. In the 3 year period from 1989 to 1992, TTAP developed team-based procedures designed to assess children to determine appropriate technology applications, an important first step in providing equipment and activities which can help optimize growth, development, and participation in normalized settings. Families are an integral part of TTAP's assessment procedures, providing input throughout all phases of the assessment.

Emergence of the TTAP model coincides with the current emphasis on assistive technology services legislated by IDEA and the Technology Related Assistance to Individuals with Disabilities Act of 1988. Although use of computer-based applications for young children with disabilities is increasing in early childhood programs, comprehensive technology assessment models are rare. TTAP meets a unique need. Evidence of effectiveness includes qualitative data on individual children and family surveys, as well as data from an OSERs research project that is studying a group of children who have been assessed by TTAP. Late in 1992, TTAP had three continuation sites with requests for replication from 21 others in six states.

Process. The TTAP Core Team roles optimally include an early intervention specialist, a technology specialist, a communication specialist, a physical therapist and/or occupational therapist, and a family representative. Each child assessed has a Support Team made up of his or her family and representatives of early intervention services and cooperating agencies. A TTAP assessment is based on careful observation and analysis of the child's behavior in typical settings and during the assessment and can be conducted in the home, the classroom, or in another setting. Tested and well-defined procedures are divided into three phases: 1) activities before the assessment; 2) activities the day(s) of the assessment; and 3) follow-up activities after the assessment. Recommendations are made for applications and equipment that would benefit the child and his/her family. Follow-up consultation, technology training for any of the child's Support Team, and re-assessment are included. Tested forms, documents, and measures used to conduct all phases of a TTAP assessment have been developed and examined for content validity. Field testing was done in three sites.

Outcomes. A TTAP assessment and its resulting recommendations have wide-spread benefits for children with disabilities, their families, and their early intervention personnel. For example, families and early

intervention agencies gain information about appropriate technology equipment and applications for the child; the assessment provides justification for equipment purchases and funding requests; and suggestions are made for incorporating assistive technology into the child's IFSP or IEP goals. A TTAP assessment provides a foundation for using technology applications to equalize opportunities for learning, communicating, and playing, opportunities that would be unavailable without technology or without the appropriate applications revealed from a thorough technology assessment.

Technology Team Assessment Process
Final Report

Goals and Objectives of the Project

Goals

The **first** and major goal met by Project TTAP was to develop, implement and demonstrate a cost-effective technology assessment model to ensure that young children from birth to eight with disabilities receive a thorough and knowledgeable team assessment and follow-up consultation that will enable them to make full use of current technology applications, including computer hardware, peripherals and software. The **second** goal was to enhance the knowledge and skills of these children's families and their local education agency and/ or service agency staff so they can function as effective members of the TTAP assessment team. The **third** goal, related to the first, was to provide the children with timely recommendations for an appropriate set of technology equipment and activities to enhance placement in normalized settings to obtain optimal development. The **fourth** goal was to aid service delivery staff and families in determining what equipment and materials to purchase in order to avoid costly mistakes and loss of time. The **fifth** goal was to disseminate the model to other schools and agencies across the country so they can develop their own technology assessment teams. Objectives to obtain these goals were completed.

Objectives

The objectives designed to meet the five project goals were divided into two components: 1) Model Development Objectives and 2) Direct Service Objectives. These objectives follow.

Model Development (MD) Objectives.

MD 1. Develop an effective team assessment measure and procedures to evaluate the technology needs of children from birth to eight who have disabilities that impair their interaction with people and objects in their environment.

MD 2. Develop effective procedures to work with families of children assessed by TTAP.

MD 3. Develop a system to follow-up TTAP assessments as children progress.

MD 4. Develop assessment materials including manuals, software, forms and informational letters.

MD 5. Evaluate TTAP model development objectives.

Direct Service (DS) Objectives.

DS 1. Provide technology assessments to young children with disabilities.

DS 2. Provide information and skills related to technology assessments to families.

DS 3. Provide information and skills related to technology assessments to program staff.

DS 4. Evaluate TTAP direct services.

Theoretical or Conceptual Framework for the Project

The Rationale for Technology Assessment

Some young children, particularly those with moderate to severe disabilities, need to use the tool functions of technology applications in carrying on their daily lives and in participating in normalized settings. However, before effective technology applications that assist children in functioning in normalized settings can be determined for specific youngsters, an appropriate team-based technology assessment must be carried out as one part of a comprehensive assessment. Each child needs an assessment to determine the most effective adaptations for him or her. Yet access to appropriate technology assessment procedures is limited since, outside of TTAP, only a few limited and partial measures which are targeted towards young children and their families are available.

Relatively new on the scene. Although early intervention services to children and families are based on results of a required comprehensive assessment of a child's abilities (including cognitive, gross motor, fine motor, communication, social or emotional, and adaptive) by a team from various disciplines, technology assessments are rare. Yet, our experience repeatedly shows that technology applications provide tools children can use to demonstrate their abilities in many of these areas. Those who drafted IDEA were also convinced of the effectiveness of technology. Conventional early intervention services are implemented **after** finding out what strategies are likely to be effective, given the findings of the comprehensive assessment; however, the technology piece is often missing, perhaps because technology applications are unfamiliar and because some professionals distrust the need for such adaptations for young children. Families are more likely to request technology assessments for their children than are agencies and schools. Access to technology is often limited by beliefs, fears and lack of training.

Technology applications for young children are relatively 'new.' Fifteen years ago the present day tools of technology were not available. Youngsters with moderate to severe disabilities were not then able to access the people, objects and events in their environments as easily and effectively as today . By 1980 equipment was increasingly available, so Macomb Projects, housed in the College of Education at Western Illinois University (WIU), began making regular use of it in training professionals in 1981 and in direct services to young children in 1983 with ACTT (Activating Children Through Technology)[1]. We have developed and demonstrated model service delivery and training technology projects, curricula and assessment procedures and products. We have also trained others through inservice and college coursework to use components of technology applications from the time we started our initial work in assistive technology eleven years ago.

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[1]Activating Children Through Technology is an EEPCD model for integrating technology applications into early intervention activities.

Currently, technology is increasing in usefulness and often diminishing in cost. Our wealth of experiences and data clearly indicate that a technology assessment should be a necessary part of comprehensive assessment for young children with moderate to severe disabilities.

Significance of assistive technology. Recent legislation[2] recognizes that assistive technology applications, including computer hardware and software, are important and effective elements of services for young children[3] with or without disabilities. The legislative requirement to place children with disabilities in settings frequented by others without disabilities carries with it the need to provide children with the support to function in settings with their peers. One way to help children with disabilities operate in mainstreamed settings is to provide technology applications for them to use. When a youngster with cerebral palsy who cannot hold a crayon is able to make a scribble or a recognizable image on a computer screen (using a switch and a graphics software program) then print the image onto paper with a color printer, that child has a tool to assist her in a classroom where other children draw on paper with paint, crayons, and markers. Some children **need** technology applications, particularly those with moderate to severe disabilities, to accomplish things that other children do easily with other tools.

We often hear a technology-naive teacher, when talking about children with disabilities, say "These children don't need computers, they need the basics." However, for many children with disabilities, technology applications **are** the basics. Further, children with disabilities must have access to the benefits of technology that children without disabilities enjoy. Technology can serve as an equalizer for a child with disabilities in many situations so that s/he can function in the same settings and accomplish similar activities that typical young children do, including playing games, drawing, making music, or moving a robot across the floor with a computer, appropriate peripherals, and software. Technology activities can assist in all these activities.

During the 1990's, families and professionals may be expected to increasingly acknowledge that technology provides important tools for use in programs for young children with disabilities. Odom and Warren (1988) predicted that "Computer technological advances will influence the nature of early intervention programs" (p. 266). They pointed to the increased use of computer technology in management of instructional programs for children (Toole, Copel & Fogarty, 1986), as dissemination tools for early intervention programs (Sandall, Fewell, Schlater, & Vadasy, 1986), as an augmentative communication device (Robinson, 1986), and perhaps as a mode of instruction (Warren & Horn, 1987). Our work continually supports these applications in spite of the wide range of barriers we find.

Need for Technology Assessment Procedures

We regularly conduct literature and information searches on technology applications via several different data bases, electronic communication systems, and through our extensive contacts throughout the

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[2]IDEA and the Assistive Technology Act for Individuals with Disabilities of 1988.

[3]The term 'young children' refers to children from birth through eight and in this report is used interchangeably with the term 'early childhood.'

country. To our knowledge, few, if any, technology assessment models specifically for young children with moderate to severe disabilities exist, with the exception of TTAP. Partial procedures, such as strategies to assess for switch use or for augmentative communication, may be in place in various agencies across the country.

A group in Minneapolis, Minnesota, developed a videotape on informal assessment which was available in the summer of 1992.[4] It shows three case studies. Another group at the Hugh MacMillan Medical Center in Toronto developed assessment software;[5] however, we found it to be inappropriate for the birth to 8 age range. The children did not attend to the format. In other areas, a school district or agency may have gathered a team together, but seldom do they have systematic assessment procedures. Behrmann has been developing an expert system, ADAPT-PC, targeted toward behavioral sequences needed for using various adaptations to be used as a decision support tool.[6] However, many of these assessment procedures are targeted towards older children, youth, and adults rather than the young children addressed by TTAP.

Professionals who address assessment issues in early childhood address technology assessment infrequently, if at all. We examined early childhood textbooks and assessment instruments used with this population in order to determine the emphasis placed on technology assessment. The indexes of 26 assessment and early childhood textbooks currently used in preservice and inservice special education training activities were examined to determine whether or not technology assessment was mentioned. The texts, published between 1980 and 1992, were recommended by three experts in early intervention who are early childhood special education consultants for the Illinois State Board of Education. In addition, we reviewed 31 assessment instruments currently used with young children with disabilities. None of the 8 early childhood assessment textbooks we examined contained information about assessing technology abilities for use by young children with or without disabilities. Of the 14 early childhood texts, only one mention of technology use was provided in a chapter by Hutinger (1987). In examining 4 references focusing specifically on technology in early childhood, only one, **Single-Input Control Assessment** (Milner, Parnes, McNaughton & Lotto, 1983) from the Hugh MacMillan Medical Center, mentioned technology assessment. Measures currently used to assess youngsters with disabilities do not include strategies to assess whether or not the child can access the world through technology or what skills s/he could demonstrate with an assistive device. Thirty-one widely used instruments were examined. None mentioned assessing skills in the use of technology applications -- not even simple switches.

We periodically post technology assessment surveys on SpecialNet. The most recent was in November 1992. In a 4-week period, only five individuals, ranging from a Superintendent to a Special Education Supervisor, responded. All agreed that technology assessments are important and that they

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[4]Personal communication with Bobbi Betz, Special Education Division, Hennepin Technical College, in April, 1992, in response to a request for information we posted on Special Net.

[5] This software is based on Single-Input Control Assessment by the Easter Seal Communication Institute, 1983.

[6]Personal communication with Michael Behrmann in April, 1992.

both needed and would be interested in TTAP model training. None of the respondents used a comprehensive technology assessment process, although one group had a protocol for evaluating facilitated communication across age groups.

Similar results were found when a group of 24 parents and professionals were surveyed at Closing the Gap's technology conference in October 1992. Twenty-two indicated that they used technology with children while 19 said that they assessed children's potential for technology use. However, only 11 said they were members of a technology assessment team. Only 2 of the 24 said they had standard technology assessments, but they were unable to name them.

In summary, although people see a need for technology assessment, useful materials and procedures related to technology assessment are scarce. While assessment for technology applications serves as part of a comprehensive assessment, only a handful of early intervention models and literature sources suggest procedures for finding out whether a child and family could and would make effective use of a technology application.

Description of Model and Participants

The TTAP Model

We recognized early that without an appropriate technology assessment based on a **team** approach which closely involved **families as full partners** determining effective technology applications for individual children had the potential for being a 'hit or miss' proposition. TTAP began in 1989, formalizing and expanding the technology assessment procedures we began using early in our work with Project MUSE (Microcomputer Use in Special Education)[7] and ACTT .

A graphic depiction of the TTAP system is shown in Figure 1. It shows the interactions and contributions of the child's family and Support Team (early intervention services personnel) with the TTAP Core Team and with the assessment process. The model has three distinct phases with specific activities occurring 1) before the assessment, 2) during the assessment or the day(s) of the assessment, and 3) after the assessment.

TTAP procedures are summarized in Figure 2. Core Team[8] members talk with family members and staff, review written background information, child therapy reports, IFSP/IEPs, and videotapes to plan the activities and materials to be used with the child. Assessments are conducted using Apple and Macintosh LC computers and compatible peripherals. During the assessment, team members make decisions on reliable movement, child positioning, suitable input method(s), software applications, and

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[7]Project MUSE was a personnel preparation project funded by the Division of Personnel Preparation, in OSERS.

[8]TTAP Core Team members include experienced professionals in early intervention, technology, communication, and occupational and/or physical therapy. A parent may represent families on the Core Team. The child's Support Team includes family members and the child's intervention team and community agency representatives.
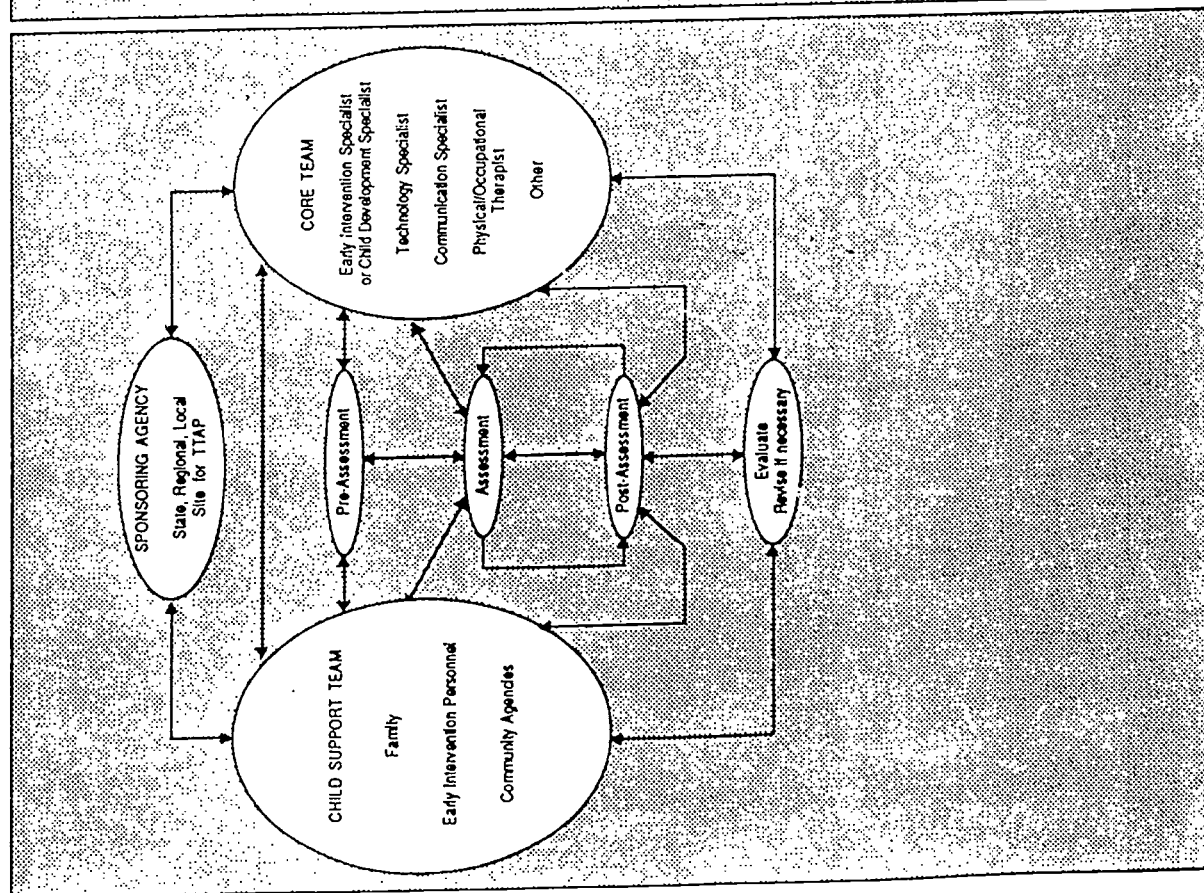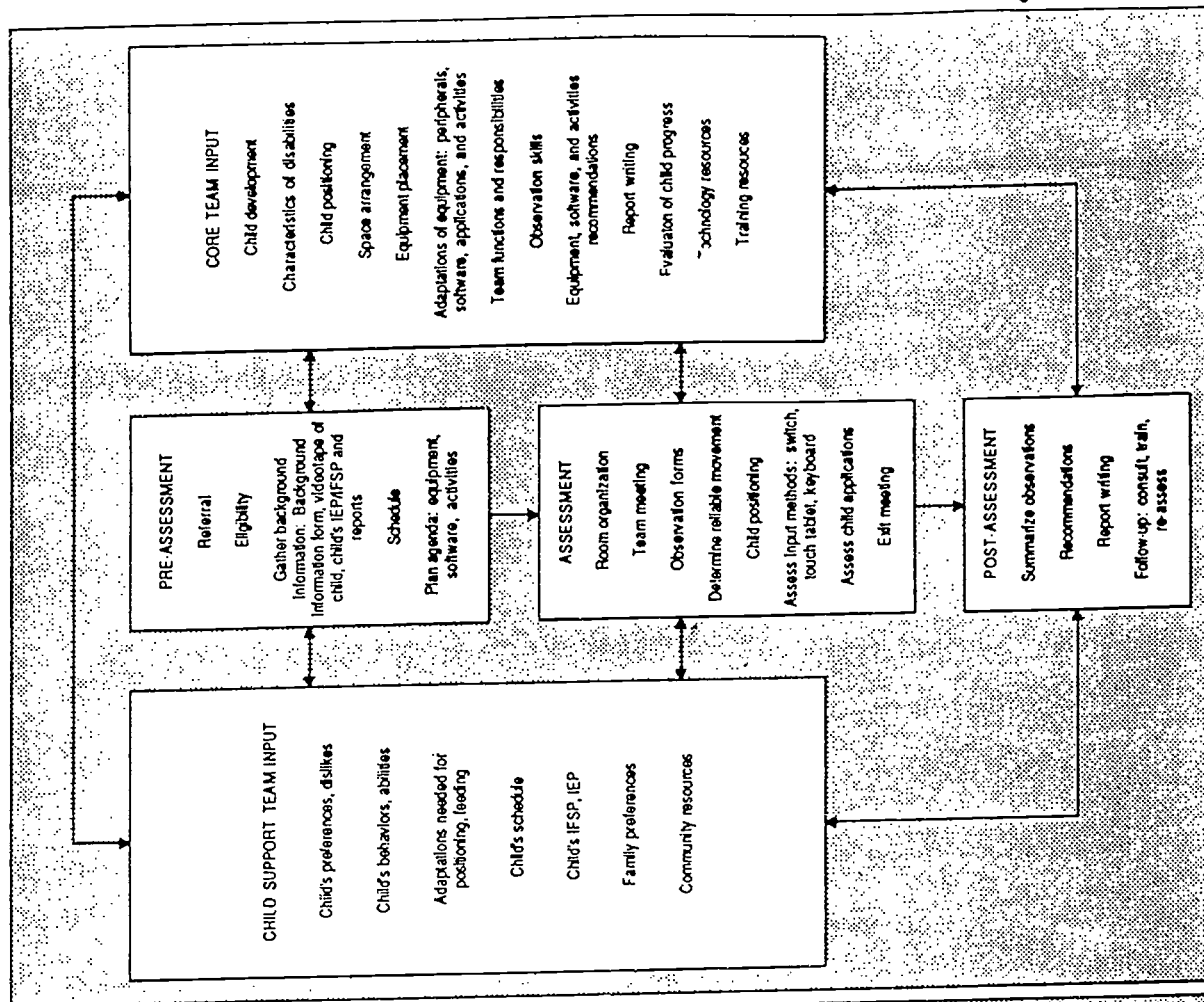
Figure 2. TTAP Procedures

CORE TEAM INPUT

Child development
Characteristics of disabilities
Child positioning
Space arrangement
Equipment placement
Adaptations of equipment: peripherals, software, applications, and activities
Team functions and responsibilities
Observation skills
Equipment, software, and activities recommendations
Report writing
Evaluation of child progress
Technology resources
Training resources

PRE-ASSESSMENT

Referral
Eligibility
Gather background information: Background information form, videotape of child, child's IEP/IFSP and reports
Schedule
Plan agenda: equipment, software, activities

ASSESSMENT

Room organization
Team meeting
Observation forms
Determine reliable movement
Child positioning
Assess input methods: switch, touch label, keyboard
Assess child applications
Exit meeting

POST-ASSESSMENT

Summarize observations
Recommendations
Report writing
Follow-up: consult, train, re-assess

CHILD SUPPORT TEAM INPUT

Child's preferences, dislikes
Child's behaviors, abilities
Adaptations needed for positioning, feeding
Child's schedule
Child's IFSP, IEP
Family preferences
Community resources

Figure 1. The TTAP Model System

SPONSORING AGENCY

State, Regional, Local Site for TTAP

CORE TEAM

Early Intervention Specialist or Child Development Specialist
Technology Specialist
Communication Specialist
Physical/Occupational Therapist
Other

CHILD SUPPORT TEAM

Family
Early Intervention Personnel
Community Agencies

Pre-Assessment
Assessment
Post-Assessment
Evaluate Revise if necessary

appropriate equipment placement. Recommendations on all of these factors are needed to ensure effective use of technology to help the child meet IFSP/IEP goals.

The TTAP model is based on a set of assumptions about the assessment process which follow.

1. We believe that the assessment should be based on the family's input, the child's abilities and developmental level, current technology applications, and team based input including members of the child's educational team from cooperating agencies. Family members and/or primary caretakers are essential members of the team.

2. Assessment activities should reflect an informal, play-based setting using an arena approach with only one or two team members responsible for the bulk of the interaction with the child.

3. Activities should be child-centered and child-directed as much as possible, given the nature of technology equipment.

4. Assessment may occur over a period of time and does not have to be accomplished in a single session.

5. Follow-up assessment and services are critical to children's successful use of technology. As a child grows, needs and behaviors change so aspects of technology applications will change.

6. Information gained from the assessment is obtained by careful, objective observation, evaluating a variety of factors and in as "normal" a situation as possible, whether it is the home, classroom, or a clinical setting. Careful observation of the child performance by all team members is necessary as are input and recommendations from all involved in the assessment.

7. Assessment outcomes depend upon effective interagency cooperation to ensure the availability of equipment, trained staff, and appropriate activities.

8. The agency or agencies, including schools, responsible for operating the TTAP team should have adequate resources available to follow up with equipment, training, and other support services as they are needed.

Participants

The children receiving TTAP assessments ranged in age from birth to eight. Originally, the target audience was a group of children who receive services in either the Warren Achievement Center in Monmouth, Illinois, or in classrooms sponsored by the West Central Illinois Special Education Cooperative. However, once news about TTAP's assessment service spread, requests for assessments came from all over the state of Illinois. Eighty-one requests for assessment were documented during the Project's three model development years.

In order to be eligible for a TTAP assessment, a child had to meet one of the following conditions:

1) be diagnosed as having a specific genetic condition (such as Down syndrome), a biological condition, or physical disability;

2) be diagnosed as having a sensory deficit, such as a visual or hearing impairment;

3) exhibit failure to maintain visual contact or grasp of objects.

Children who met none of these criteria or who were not diagnosed as having a particular disabling condition were eligible for a technology assessment if their parents and/or program personnel, after observing and working with the child, agreed that he/she did not respond to people, objects or events in their environment.

The children assessed by the TTAP team often had multiple disabilities. Included in the target audience were the families of the children who received assessments and the various early childhood professionals from various disciplines responsible for assisting with the child's service delivery activities related to the IFSP or IEP, where appropriate.

Problems and Solutions

Few problems were encountered in developing the TTAP model. Many procedures were based on our earlier experiences in carrying out informal assessments in ACTT. Procedures based on a team approach were established for assessing children for technology use. Minor snags encountered were quickly resolved, often by such simple methods as adjusting the process according to evaluation input from staff and clients then creating a new form for planning the assessment or revising an observation form. As new situations and challenges occurred, the TTAP staff responded to them efficiently and effectively. During the entire process, staff members sought new information from our many technology expert sources and maintained an ongoing search of related literature.

Operating as an assessment team, incorporating the strengths of each member, evolved as we conducted more technology assessments. In the beginning, sometimes a team member went beyond the parameters of the technology assessment, bringing in other aspects of a comprehensive assessment that were not appropriate for the TTAP team to address. We solved this problem by discussing the specific purposes of a technology assessment and differentiated between our work and that of a medical professional, for example.

One challenge was the excessive length of time necessary to write the final assessment report and recommendations. The lengthy original documents required more time than staff had available to complete them in a timely manner. We decided that we were trying to achieve too much with a single document (i.e. a complete log of each child's assessment process from initial request for assessment through the actual planning of the assessment and the assessment itself; a vehicle for educating those readers who were naive about hardware, peripherals, and software programs; as well as recommendations for the child's technology use). This problem was resolved by evaluating the purpose of the assessment reports, analyzing the contents to decide which information was essential and which was interesting but not as necessary, then revising the report outline. Once that was accomplished, the assessment reports and recommendations were available to families and schools more promptly. Videotape of each assessment was always available if other information was required that was not included in the original report.

Ideally a TTAP assessment involves not only members of the Core Team (provided by Project TTAP staff) but also a Support Team of the child's family, his teachers, and various therapists or other service providers. Sometimes a complete Support Team was not available -- sometimes because of schedule conflicts or travel difficulties, sometimes because families wanted the assessment but the school or agency did not. In the first case, the TTAP assessment proceeded with a full Core Team and as many members of the Support Team as could attend. Staff attempted to fill the gaps made when Support members could not attend by contacting them prior to the assessment to gather their input about the child.

In the second case, we often found that when a teacher or therapist was absent from the assessment , the school tended to be non-supportive of the family's wish for assistive devices. Often the TTAP recommendations were ignored. We found that follow-up and support by schools and therapists was much more likely to occur when the teachers and therapists attended the assessment and saw for themselves what technology could do for the child. Although we offered training to families and staff, and although we attended IFSP or IEP meetings when invited by the families and/or schools, a position which denied the positive effects of technology was very difficult to change. Videotape of the child using various applications was useful. However, parents often found that schools were unresponsive to their wishes and their children's needs. Sometimes advocates and due process hearings were requested before recommendations were grudgingly followed.

Since TTAP is based on an observational process, establishing reliability was a time consuming process until examples and descriptions of expected behaviors were developed. Because most of the children assessed demonstrated severe disabilities, comprising a small percentage of young children with disabilities, the numbers of children upon which the TTAP assessment process is based is not as large as the samples found in norm-based assessment instruments. Furthermore, the range of disabilities demonstrated by the children was broad, so TTAP processes were developed to account for a variety of individual differences. Another problem in developing a reliable observation process was that technology applications for children with varying disabilities differ and must be accounted for in the process.

Collecting follow-up data on the TTAP children and families was accomplished; however, comprehensive data were not easily collected. Our solution to that problem was met when we received funding for a two-year research study with a qualitative design to do case studies on a random sample of TTAP children. That study is now in process and will be completed in June, 1994.

A training package was developed which included the production of an interactive CD-ROM, **Tap Into TTAP**[9]. Initially, a greater amount of time than we originally anticipated was required to accomplish this task. Staff did a great deal of reading, attending meetings with TTAP's technology specialist, and educating themselves about CD-ROMs and their production. Planning, writing, editing, revising, gathering

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[9]Tap Into TTAP, an interactive CD-ROM and videodisc package launched on a Macintosh platform, is a multimedia training package designed to teach users about the TTAP assessment model at both the knowledge and skills levels. The package contains a case study, training information, and competencies. It will also be available in print and video formats.

and selecting photographs and videotapes of assessments, recording and re-recording the sounds and narrative all were very time-consuming. Timely accessibility to much of the equipment needed to create the CD-ROM was a major factor in the delay of production. We spent valuable time waiting for equipment purchases to be approved or for ordered equipment to arrive. The CD-ROM, **Tap into TTAP**, is now in its final stages of development and will soon be available.

One of the major problems associated with TTAP has nothing to do with the development of the model itself. Rather, it has to do with the fact that technology is so unfamiliar and threatening to many professionals that it is difficult for them to accept the potential offered to children. Because of this, professionals often decline training in technology uses in spite of availability. Equipment and developmentally-appropriate software are often unavailable to children for this reason as well as lack of resources. Even when equipment is sent from home to school so that it will be available to a child, that equipment may sit on a shelf, unused. Without staff training and appropriate equipment, TTAP recommendations cannot be carried out and will not benefit children and families. One of our greatest areas of discouragement is when families acquire the needed equipment, but schools refuse to use it or acquire it. We look forward to the positive impact of the assistive technology portion of IDEA on this situation. In the meantime, we provide follow-up and support to families and intervention personnel whenever requested.

Evaluation Findings

Effectiveness of the Model Assessment Process

Since technology assessment is still in its 'infancy,' development of instruments and procedures such as we have developed in TTAP is in a beginning stage. No instruments or procedures to use as comparisons are presently available. Data gathered from TTAP is primarily qualitative and suggests that the process and recommendations are valid and reliable. An outline of the entire TTAP process may be found in Appendix A. TTAP is based on the use of observational instruments such as an **Individual Trial Form** and **TECH ACCESS** (contained in part in Appendix A). Videotape records of children in their typical settings and during the assessment are used.

Three sites, Rehabilitation Institute of Michigan in Detroit, MI; Signal Centers, Inc. in Chattanooga, TN; and the Society for Manatobans with Disabilities, Inc. in Winnipeg, field-tested the TTAP process and materials then provided us with feedback. A meeting was held at our site in late summer 1992 to summarize feedback and make final changes in the written content of **Tap into TTAP**. In addition, a Head Start site at the Springfield Urban League, began using and adapting our processes to assess children for participation in its program.

Appropriateness of the process. TTAP was designed using elements of IDEA and appropriate assessment procedures discussed earlier. We use a team approach in an arena assessment setting which

is as close to the child's typical setting as possible. The TTAP Core Team, the child's family, and other members of the child's Support Team are involved in the process. Each assessment is videotaped, so that video data for analysis is available to make comparisons when follow-up assessments are conducted. The videotapes are reviewed when final recommendations are made for each child and before a follow-up assessment.

Establishing validity. TTAP procedures and measures were tested during model development and have been reviewed and critiqued by experts during our service delivery phase to determine that the content of the assessment process demonstrates **face validity.** **Content validity** has also been determined, using expert critiques and our own experience, to make sure that the TTAP process contained the content we intended to assess. Preliminary procedures and observation forms were revised based on the results of these reviews; then the process and forms were critiqued again.

Establishing reliability. TTAP team inter-rater reliability on recommendations made after an assessment is 98%. Preliminary reliability checks indicate that inter-rater reliability on the input section of TECH ACCESS is 89%. In another study of 10 professionals agreements range from 92% on "establishing reliable movement" to 100% on input device recommendations. Another small study also considered the recommendations resulting from a TTAP assessment. In that study, two parents' and 18 professionals' agreement with TTAP recommendations for three different children, produced agreements of 88%. These individuals received TTAP training.

Further evaluation findings regarding TTAP's effectiveness are given in the following section entitled **Project Effectiveness, Products, Dissemination Activities.**

Project Effectiveness, Products, Dissemination Activities

Positive Outcomes

The results of a TTAP assessment, with accompanying recommendations, show positive outcomes for children and families when equipment is available and when parents and staff are trained to use technology with children. Families report progress. Teachers report progress. We have observed progress when we view videotapes of the children over time. Forty-four children with severe disabilities have received TTAP assessments through December 1992, during the model development phase. Eighty-six percent of these children demonstrate multiple disabilities. Based on our extensive experience with children, families and technology, we believe that number is large enough to demonstrate the effectiveness of our procedures.

The target group of children who have moderate to severe multiple disabilities which interfere with their interaction with objects, people, and events in their environment, comprise only 2 to 3% of the population of children with disabilities. Each comprehensive technology assessment requires an extensive

input of time. The entire process is not necessary for children with less severe disabilities. The time factor practically reduces the number of children on which we base claims of effectiveness.

The claim for effectiveness of the outcome of a TTAP assessment is based on three sources of data on children and families. The first data source includes observational data from families, teachers, and support staff. The second is composed of information from surveys sent to selected families who have agreed to respond. The third source is comprised of in-depth qualitative case studies which include follow-up interviews and observations on a group of 7 children and families assessed by TTAP as well as a group of seven children who have used technology for a number of years since they were in preschool or birth to 3 programs. The follow-up data collection capability is provided through a Macomb Projects' qualitative research study, funded by OSERS in December of 1991. The study continues through December 1993. Elements denoting effectiveness from the initial activities in these case studies are provided in the following paragraphs.

We now know that the assessment recommendations generated by TTAP are likely to be incorporated into services when the child's family and other members of the initial Support Team participate in all phases of the assessment . However, we know that when the child moves into services with other personnel, the technology applications' benefits may be lost if the new staff are not trained to use technology. The availability of resources for equipment purchase also affects the outcome of assessment recommendations. More than 60% of the families we have assessed report problems in acquiring recommended equipment. For this reason, we have developed a manual on obtaining funding and produced a videotape from a satellite television program on funding technology for young children.

Data from Surveys and Files

Complete records are maintained on a sample of 25 children and families. (See Table 1.) In addition, we maintain follow-up survey data from a sample of 20 families. Follow-up on children is an integral part of the TTAP process; however, we do not routinely ask all parents to fill in our questionnaires because, we believe that families have many intrusions and we do not wish to make more demands or add more stress.

Follow-up records show that, when resources are available, children who receive TTAP assessments use the applications recommended for them in the TTAP assessment. A group of six children are not using the recommendations because equipment and software are not available, or school personnel are not committed to technology use. We routinely offer families and staff opportunities for further training, but it sometimes takes several tries before staff take advantage of the opportunity. This is particularly the case when the family is the source of referral and when professional staff are reluctant to participate on the child's Support Team. Fifty percent of the families surveyed indicated that their child's teacher, therapist, or support personnel need technology training.

Table 1: Information from Files of 25 TTAP Children

Name	Schl Atend	Admin Suprt	TTAP/Rcmds	Due Process	Home/School	Parents	Request	Home/Tech	Return Survey	IFSP/IEP
Erika	no	yes	no	no	no	no	family	yes	yes	no
Jenna	yes	no	yes	no	no	yes	family	yes	yes	yes
Jessica	yes	yes	yes	no	no	no	school	yes	yes	no
Judi	yes	don't know	yes	no	no	no	school	no	yes	no
Steven	yes	yes	yes	no	don't know	no	school	yes	yes	no
Camille	yes	yes	no	no	yes	no	school/agency	don't know	no	no
Grant	no	no	yes	no	yes	no	school	yes	yes	no
Michael	yes	yes	yes	no	no	no	school	no	yes	no
Emily	no	don't know	don't know	no	yes	yes	school	yes	no	no
Sean	yes	yes	yes	no	yes	no	family	no	yes	no
Joey	yes	yes	yes	no	yes	no	school	yes	no	no
Jason	yes	yes	yes	no	yes	yes	school/agency	no	yes	yes
Zaynab	yes	yes	don't know	no	yes	yes	family	yes	yes	no
Jeremy	no	don't know	don't know	no	don't know	no	school	don't know	no	no
Bree	yes	don't know	yes	no	don't know	no	family	yes	no	no
Jarred	no	yes	no	no	no	no	family	no	no	no
Joshua	no	no	no	no	no	no	family	no	no	no
Kevin	no	yes	don't know	no	no	no	family	no	yes	yes
Peter	no	no	don't know	no	no	no	family	no	no	no
Scott	yes	yes	yes	yes	no	no	family	yes	yes	yes
Matt	yes	no	no	no	no	no	school/agency	no	no	no
Ben	yes	yes	yes	no	no	yes	school	yes	yes	yes
Tiffany	no	yes	don't know	no	don't know	no	family	yes	no	no
Kevin	no	no	yes	no	don't know	no	family	don't know	yes	no
Bryan	no	yes	yes	no	no	yes	family	yes	yes	yes

RESULTS	Schl Atend	Admin Suprt	TTAP/Rcmds	Due Process	Home/School	Parents	Request	Home/Tech	Return Survey	IFSP/IEP
	no = 11 (44%)	no = 7 (28%)	no = 6 (24%)	no = 24 (96%)	no = 16 (64%)	no = 20 (80%)	family = 14 (56%)	no = 8 (32%)	no = 12 (48%)	no = 20 (80%)
	yes = 14 (56%)	yes = 13 (52%)	yes = 13 (52%)	yes = 1 (4%)	yes = 4 (16%)	yes = 5 (20%)	school = 11 (44%)	yes = 14 (56%)	yes = 13 (52%)	yes = 5 (20%)
		dn = 4 (16%)	dn = 6 (24%)		dn = 5 (20%)			dn = 3 (12%)		

The results of the chart reflect the number of children (25) who were assessed by the TTAP staff from 10/89 to 11/91. However, follow-up surveys were not sent to all parents because the requisite time had not elapsed between assessment and follow-up.

Schl Atend (School Attended): School personnel represented during the child's TTAP evaluation.
Admin Suprt (Administration Support): As a result of the TTAP report, the school/agency is willing to integrate the recommendations into the child's curriculum.
TTAP Rcmds (Technology Team Assessment Process Recommendations): Either the family, school, or agency has implemented technology into the child's goals.
Due Process: Because of lack of services or tools for the child, the parents are pursuing legal proceeding against the school or agency for the rights of their child.
Home/Sch. (Home/School): Technology is being used for the same purposes and/or goals for the child in the home, school, or agency.
Parents: Parents received technology training to assist the family or school/agency.
Request: TTAP evaluation was requested by the family or school/agency.
Home/Tech (Home/Technology): The parents have and are using technology in the home. This could either be by low or high technology (low technology being a switch attached to a battery operated toy and high technology being a computer with an adaptive device).
Return Survey (Returned Survey): The parents have returned or given their results over the phone for the TTAP Assessment Follow-up Survey.
IFSP/IEP (Individual Family Service Plan/Individual Education Plan): Technology has been written into the child's IFSP or IEP.
Re: Don't know: A "don't know" response means either the parents were unable to answer the question or the questionnaire was never returned and staff do not know the answer.

Comments from families indicated that schools are sometimes not responsive to children's needs and families' wishes for assistive technology in spite of the positive effects on the child's interaction with others, ability to communicate and to play. Regarding technology in the IEP, one mother wrote," *We tried, but they won't put it in. Chris (speech therapist) said he did very well. They just won't do it.*" Another said, "*Everyone knows at home how to use the computer. His teacher/school doesn't want to learn.*" One parent wrote, "*We as a family have acquired the needed equipment, but the school is still lacking in computer equipment.*"

When asked if they had encountered any other problems related to their child's use of technology, parents responses indicate that their efforts in getting assistive technology for their children presented a rocky road. "*The school is non-supportive of his augmentative communication.*" "*The school district has computer phobia.*" "*Not much interest shown for technology at school.*" "*J. does use a LightTalker mounted on the wheelchair. He is talking a lot more. School goal for J. is to cut with scissors. After pushing the school, they are using a computer. They are training him for use of joystick on his wheelchair. The school can't think of J. using the computer for a written task. J. is a 5 year old who hasn't the opportunity to use the computer at school.*" "*The assessment was presented to the school administrators and teacher. They agreed to let him have an electric typewriter, but have not been using it on a regular basis. They prefer that he learn to write with a pencil.*"

Family responses reflect changes in child behavior. One mother said, "*Broadened his horizons greatly. Changed our lives. AudioScan (he has gone beyond that) made a big difference. Made B. feel good about himself.*" Another said, "*J. has made some nice gains in the classroom. He can count, identify objects 95% of the time. It is a cross categorical program.*" Another mother said, "*M. has learned his numbers to 5, colors, and shapes on the computer.*"

The goal of a TTAP assessment is to make appropriate recommendations for technology applications then to provide follow-up assessments. Yet early intervention and school-based programs are often reluctant to include these recommendations in IFSPs or IEPs ,for one reason or another. Technology is written into 35% (n = 7) of the children's IFSPs or IEPs, according to the 20 family survey responses, while files on the group of 25 children indicate that 13 are using technology in school, and 14 are using applications at home. Parents cite specific goals including the following: "*At this time use of his power wheel chair;*" "*Only a given amount of time;*" "*For as much independent computer time to develop and fully understand a vocabulary of words, reading, and possibly speech;*" "*Prior goal was met (language goal based on software I obtained). School will not purchase the next higher level program.*" Another wrote, "*Any adaptive equipment as deemed necessary by parents and staff! That's all the school would let us do. We are thankful for that. But they did write in adaptive P.E.*"

Parents said they would like to see goals related to the following: "*To help entertain';*" "*To help communicate;*" "*Work toward employment and schooling.*" "*Future use in school for reports, etc.*"

When parents were asked to list additional comments, three asked if we could help in developing IEP goals and objectives. This request was also made by Janet McCulloch of the Illinois State Board of Education recently. We have attended IEP staffings for several children. Perhaps school districts are reluctant to write technology applications into the IFSP or IEP, in part because of present economic conditions and budget crunches, for some districts **do** provide children with adaptations without the formal IEP in place.

Parent Evaluation of the TTAP Assessment

Parent evaluation data is presented in this report for several reasons: parents are likely to request the evaluation; parents and/or primary caretakers always accompany their child to an assessment and participate in the process; parents tend to be positive about their child's use of technology while programs sometimes drag their feet; and parents have an overall view of the child's progress as s/he moves through services. We also collect data from intervention staff.

Survey responses from 20 parents indicated that 95% found the TTAP assessment helpful. One mother indicated that the assessment helped her *"realize what she* [the child]*could learn and what's available to help her learn."* Another family wrote that they were *"able to see that computer technology is available to J."* Another mother said, *"It helped us obtain the computer system for his classroom."* Another responded, *"Have provided the school district with a written assessment on the most effective input devices and software to use with my child."*

The written assessment report was used by families for a variety of purposes. *"It was used in further evaluation at Iowa City Clinics"* (University of Iowa Medical Center). This mother also reported that *"In Iowa City, speech therapists supported this and other suggestions to further her education."* Other parents indicated the report was *"Useful in determining where he was. Take to agency for support for funding"* Another family said, *"We still use it. Let classroom teacher read the report. It is permanently in her files. It's nice to have the report because it's not just 'Mom said she is using the computer.'"*

We recently received a letter from a mother and father who requested that their letter be included with the survey they completed. The letter said:

> *The technology assessment of our daughter, P., was a most worthwhile and enjoyable conference. By completing all the background material and by our discussions with the team before the assessment began, we agreed as to the purpose and goals for P. using a computer. Various software packages were tried for P. This gave us opportunities to see what would be good for her in a way that would not have otherwise been possible.*
> *The personnel involved in the assessment were very knowledgeable and very nice and answered our questions. All of this combined to make the assessment a most worthwhile and enjoyable experience. I would recommend it for anyone who has a child who could benefit from such an assessment.*
> *I would hope that future funding could be made for this educational tool.*

Dissemination Activities

Between June 1990 and December 1992, Project staff gave 20 presentations and workshops listed in Table 2. One thousand eighty nine people (see Table 3) received awareness information either during those presentations or through the mail. Project staff were involved at the local and state as well as national level in numerous capacities, such as serving on Advisory Boards, training personnel, serving as resource persons, and cooperating with national organizations such as RESNA, TAM, and the National Cristina Foundation.

Table 3: Outcomes of TTAP Services

People Receiving Awareness Information	1089
Children Receiving TTAP Assessments	44
Family Members Participating in TTAP Assessments	81
Early Intervention Personnel Participating in TTAP Assessments	55
Families/Early Intervention Personnel Receiving Information on Equipment and Funding	152

TTAP was invited to present a session on technology assessment at the Breaking Boundries Conference sponsored by the Iowa, Minnesota, Nebraska, and South Dakota state assistive technology projects. Staff were also asked to provide a workshop on technology assessment to speech therapists during Wisconsin's annual Augmentative Communication Conference. TAM conference planners requested a preconference workshop on technology assessment for the January 1992 conference. Articles about the Project have appeared in 6 national publications and one Illinois publication. Information about the Project has also appeared five times on SpecialNet, either as general bulletin board information or as a survey about technology assessment. Table 4, **Indicators of Impact**, provides further information about the Project's many activities.

Products

A major product undertaking was the multimedia[10] training package, **Tap into TTAP**. Now in its final phase of completion, **Tap into TTAP** provides a detailed description of all phases of TTAP's

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[10]Interactive multimedia refers to computer-centered technologies which include videodiscs (laserdiscs), CD-ROMS, and other modalities that give a user the capability to access and manipulate text, sounds, and images, including real time video.

Table 2: TTAP Presentations and Workshops

December 1992   "A Technology Team Asssessment Process," poster session, CEC/DEC International Conference. Washington, DC.

November 1992   "Adaptive Computing," WISTECH Children with Disabilities and Assistive Technology Conference, 4 sessions, Madison, Milwaukee, Eau Claire, and Green Bay, WI.

November 1992   TTAP Model training for early childhood personnel, Thomas Jefferson School, Peoria, IL

October 1992   "Assessing the Child with Severe Disabilities," training for Technology Inservice Project, Normal, IL

October 1992   "Assessing the Child with Severe Disabilities," training for Technology Inservice Project, Macomb, IL

October 1992   "Making Technology Decisions for a Young Child." Closing the Gap Conference, Minneapolis, MN

September 1992   "A Technology Team Assessment Process," Wisconsin Conference on Augmentative Alternative Communication and Assistive Technology, Eau Claire, WI

September 1992   "A Technology Team Assessment Process," Breaking Boundries Through Assistive Technology Conference, Sioux City, IA

August 1992   "Assessment for Assistive Technology Needs," Partnerships for Progress V Conference, National Early Childhood Technical Assistance System. Arlington, VA

August 1992   "Technology: A Young Child's Tool for Achieving Developmental Goals." Assistive Technology Training Institute. Project START and Mississippi Department of Education. Hattiesburg, MS

March 1992   "Assessing a Young Child's Use of Technology," Decatur Educational Conference, Decatur, IL

March 1992   "Going Beyond Causality with Switch Activities," ACTT III Conference, Western Illinois University, Macomb. IL

February 1992   Technology Workshop, Consolidated Community School Dist. #93. Carol Stream, IL

January 1992   Preconference Workshop: "Assessing a Young Child's Use of Technology," International Technology & Media Division, Council for Exceptional Children Conference, Albuquerque, NM

October 1991   "A Technology Team Assessment Process." Closing the Gap Conference. Minneapolis, MN

April 1991   "Creative Use of Technology in Early Intervention," 1st Annual Illinois Early Childhood Conference, Oakbrook, IL

March 1991   "Determining What Role Technology Can Play in a Child's Life: A Computer Assessment Process." ACTT II Conference, Western Illinois University, Macomb, IL

January 1991   "Evaluating the Effects of Technology on Preschool Children, Their Families. and Teachers." 5th Annual International TAM Conference, Kansas City, MO

September 1990   "Project TTAP: Conducting a Technology Assessment for Young Children with Disabilities". APPLES Conference. Springfield, IL

June 1990   "Using Assistive Technology with Young Children." member of panel for plenary session. Capitalizing on Technology: 1st Annual Meeting of States on Assistive Technology, RESNA Technical Assistance Project, Washington. DC

Table 4: Indicators of Impact

1.00	**Awareness**	9/89 - 12/92
	Number of persons receiving materials via conference attendance and participation	954
	Numb_; of persons requesting awareness materials or information by phone/letter	56
2.00	**Stimulating High Quality Programs**	
	Number of children served at two continuation sites	225 - Warren Achievement Center variable - IATP
	Disabilities of children served at continuation sites	*
	Number of children served at sites requesting replication	1782
	Disabilities of children served at sites requesting replication	*
3.00	**Product Development/Distribution**	
	Number of products available:	
	The Technology Team Assessment Process	3-part procedures narrative 44 documents

	Tap into TTAP Training Package
	   CD-ROM
	   Written Manual
	   Assessment Forms
		multimedia package

	Child Assessment Software	1 6-part program in development 1 4-part program in development
	Number of requests for products	43
	Number distributed	3 to field test sites 13 manuals 20 single documents
	Number of edited assessment videotapes	1 overview 1 assessment of input methods 1 selected assessment examples 1 case study
	Number of viewers	789
	Number of children served by those receiving Project materials	9468

*Various disabilities including communication disorder or delay, physical disability, visual impairment, hearing impairment ,learning disability, developmental delay and multiple disabilities.

4.00   Training
Number of requests for training   47

Number of workshops conducted   5 pilot workshops

Number of professionals receiving training   45

Number of children with disabilities served by
number of persons receiving training   584

5.00   Other Technical Assistance/Consultation
Number of requests for assessments   81

Number of children served with increased high quality services   44

Number of persons receiving information on assessment
techniques, hardware and software recommendations, and
sources of funding for equipment   152

6.00   Local/State Involvement and Coordination
Director serves on Advisory Board for
Illinois Assistive Technology Project   1990 to present

Director serves as Chairperson and TTAP Trainer
serves as committee member for Training Subcommittee
for Illinois Assistive Technology Project   1990 to present

Director serves as Consultant to Illinois State
Board of Education   1990 to present

Participate in training for the statewide trainers for
Illinois Assistive Technology Project   August. 1991

Provide assessment presentation at regional education
conference   March. 1992

Provide presentation at state early childhood conference
hosted by Illinois State Board of Education   April. 1991
                                                 April. 1992

Provide presentation at annual conference hosted by Project
APPLES for families and professionals in R*TAS regions   September. 1990

Provide TTAP awareness training to school district
in Carol Stream, Illinois   February. 1992

Provide presentation to family support group   January. 1992

Media coverage of Project activities
Statewide newsletter articles in Illinois   3

Provide technology assessment training for Technology Inservice Project: at Macomb and Normal, IL		October, 1992
Provide TTAP model training for Thomas Jefferson School, Peoria, IL		November, 1992

7.00 Regional/National Involvement and Coordination

Present poster session at CEC/DEC International Conference	December, 1992
Provide assessment presentation at international Closing the Gap Conference	October, 1991 October, 1992
Provide assessment presentation at national NEC*TAS Conference	August, 1992
Provide technology assessment information during presentations at conferences sponsored by state technology projects Mississippi Iowa, Nebraska, South Dakota & Minnesota Wisconsin	August, 1992 September, 1992 October-November, 1992
Present technology assessment session at Wisconsin's statewide augmentative alternative communication conference	September, 1992
Provide assessment presentations for national conferences hosted by Project ACTT	March, 1991 March, 1992
Provide technology assessment workshop for international conference hosted by Technology and Media Division of Council for Exceptional Children	January, 1992
Coordinator provided technology assessment information to state tech grant representatives as member of early childhood panel for plenary session at RESNA Technical Assistance Project conference	June, 1990
Participate in activities of National Cristina Foundation	1989 to present
Media coverage of Project activities Newsletter articles SpecialNet bulletin	6 national publications 1 statewide publication 3 assessment surveys 2 project information posted

assessment process together with procedures, forms, and examples of child applications and equipment. The training package will also be available in conventional print form with videotapes.

The backbone of the multimedia version of **Tap into TTAP** is a CD-ROM which runs on a Macintosh computer. This approach offers an exciting, individually paced learning experience not available until multimedia applications and equipment were produced. If TTAP receives further funding, we intend to add child assessment software, laserdisc case studies, and a comprehensive section for participants to test their skills in **Tap into TTAP** , with subsequent revisions and additions as necessary. Child assessment software, which isolates elements of software characteristics such as sound, movement, graphics, and color is already in the planning stage. **Tap into TTAP** contains sections on replicating the assessment process, case studies, child software, forms which can be printed out from the learning environment, and a competency check. We have a CMI CD Desktop Recording System which will allow us to revise the CD-ROM containing the software to drive **Tap into TTAP** as well as all the elements of the package, and produce them for distribution without relying on expensive outside companies and processes. With this equipment, we can revise the CD-ROM ourselves when necessary.

In addition to **Tap into TTAP**, the Project has developed the **Technology Team Assessment Process** manual which gives step-by-step procedures and considerations for all aspects of each phase of the technology assessment, from referral to final recommendations and follow-up. This manual includes forms for use before, during, and after the assessment, as well as samples of completed forms illustrating the type of information sought. Resource lists and information on hardware, software, and adaptive materials are included.

The Project has also developed an observational tool called **TECH ACCESS** for use during technology assessments. **TECH ACCESS**, which stands for "Technology Assessment for Computer Capability for the Education of Special Students," is used to record observations and comments about the child's ability to use various input devices (switches, touch tablets, or keyboard). General statements about the child's behavior, performance, interaction with people, equipment, software, and other events may also be recorded on the form. Recommendations for input based on strengths and weaknesses of each input method may be made based on the information recorded on this form. A sample of **TECH ACCESS** and an Individual Trial Form, also developed by TTAP staff, is contained in Appendix A.

Future Activities

Macomb Projects, through Western Illinois University, applied for Outreach funding through USDE's Early Education Program for Children with Disabilities in December of 1992 to provide training based on the TTAP model to teams in schools, agencies, and programs. We will continue to seek further funding for other aspects of TTAP, including product development . Project products, such as the CD-ROM, the **Technology Team Assessment Process** manual, and the **TECH ACCESS** observational tool,

will continue to be produced and made available to interested persons. In addition, at least one article based on Project findings is planned for submission to a selected journal. We continually receive referrals for TTAP assessments and will explore alternatives to providing those assessments.

Assurance Statement

One copy of this full final report has been sent to ERIC. Copies of the title page and abstract from this final report have also been sent to NEC*TAS, the National Clearinghouse for Professions in Special Education, NICHCY, the Technical Assistance for Parent Programs Project, the National Diffusion Network, the Child and Adolescent Service System Program, the Northeast Regional Resource Center, the MidSouth Regional Resource Center, the South Atlantic Regional Resource Center, the Great Lakes Area Regional Resource Center, the Mountain Plains Regional Resource Center, the Western Regional Resource Center, and the Federal Regional Resource Center.

Further information about the Technology Team Assessment Process, its procedures and products can be obtained by writing Dr. Patricia L. Hutinger, Macomb Projects, 27 Horrabin Hall, Western Illinois University, Macomb, IL 61455.

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Appendix A

TTAP Procedures

Before the Assessment

I.   Family, school or agency sends TTAP a referral form or contacts TTAP by telephone to request a technology assessment

II. TTAP sends the family a Background Information Form to complete and return.

III. TTAP asks for additional information.

   A. Family is asked to sign a release form to allow IEP's or IFSP's, medical and records school records or evaluations to be sent to the TTAP office.

   B. Family is asked to provide TTAP Core team* with a 10 to 15 minute videotape of their child participating in day to day home or school activities.

   C. Family is asked to suggest possible assessment dates and times that are convenient for them.

   D. Family is asked for names of the child's support personnel they would like to have attend the assessment to serve as members of the Child Support team.**

IV. TTAP Core team evaluates the preliminary information given in the Background Information Form, views the child's videotape, and makes preliminary observations.

V.   TTAP contacts the child's Support team and invites them to attend the assessment.

   A. Tentative days and times are given.

   B. Tentative goals and objectives for the child are discussed.

VI. TTAP contacts the child's family again.

   A. An assessment date and time is set.

   B. Tentative goals and objectives for the child are discussed.

   C. Family is asked to bring the child's adaptive devices, toys, or appropriate snacks to the assessment.

* The Core team consists of early childhood professionals and technology specialist who conduct the technology assessment.

** Child Support team includes the family, and any support personnel the family invites (child's teacher, babysitter, therapists).

VII. TTAP Core team prepares for the assessment.

    A. Confirmation letters are sent to family and other members of the Support team.

    B. A meeting of Core team members is held to discuss and evaluate strategies based on child's records, background information, and videotaped segment .

    C. A tentative assessment agenda is organized.

    D. Equipment, software, and materials are chosen.

    E. Necessary modifications are made to equipment and materials.

    F. Overlays are customized.

    G. Additional support personnel are contacted and scheduled to attend the assessment.

    H. The assessment room is reserved for the assessment day.

    I. Video equipment and cameras are reserved for the assessment day.

    J. Equipment, software, and materials are gathered.

Assessment Day

I. TTAP Core team prepares for the assessment.

    A. All necessary equipment and materials are arranged in the assessment space or room.

    B. The assessment space or room is organized into areas: a conference area, the assessment area, a play area, an observation area, and a display area.

    C. Video cameras and monitors are set up if they are to be used.

II. The team gathers.

    A. After introductions, the child is taken to the play area.

    B. Core and Support teams hold a pre-assessment conference.

        1. All team members sign in.

        2. The assessment process, the purpose, and goals are discussed.

3. The agenda is reviewed and altered if necessary.

4. Consent forms are signed if they have not been signed previously.

5. Observation forms are distributed and explained.

III. The Core team, aided by Support team input, conducts the assessment.

    A. All activities are videotaped.

    B. Observers' responses to all activities are recorded on the observations forms.

    C. A non-directive approach is used with the child.

    D. The child's lead is followed.

    E. The child's most appropriate position and reliable movement are determined.

    F. Input devices are assessed to determine the most suitable input method.

    G. Software and computer activities are assessed.

    H. Breaks are taken at appropriate intervals.

    I. The assessment is ended when child indicates fatigue or when adequate information for making recommendations has been gathered.

IV. Core and Support teams meet to discuss the assessment while child is taken to the play area.

    A. Informal observations from all members are heard.

    B. Observation forms are gathered.

    C. The assessment is evaluated with regard to the original goals.

    D. Preliminary recommendations are made.

    E. Family is advised that they will receive an assessment report and recommendations.

        1. Family is asked to provide names of people to whom they wish the report sent.

V. The Core team provides family and other Support team members with information on equipment and resources.

    A. Equipment, peripherals, and software are displayed.

B. Catalogs from various vendors are made available.

C. Resource information is given on state, regional, or local agencies.

VI. The assessment ends.

A. Before they leave, family is encouraged to contact the Core team if they have questions.

B. Video and computer equipment, software, and peripherals are removed from the assessment area.

C. Resource and customized materials are packed and stored.

After the Assessment

I. Core team members view the assessment videotape and record any further observations.

II. Core team members review and summarize all observations noted on each activity's observation forms.

III. One member compiles all information and recommendations into the assessment report.

IV. Core members approve and sign the report.

V. The child's family and those support persons whom the family has designated receive copies of the report.

VI. The Core team advises the family that training and follow-up services are available for them.

VII. The Core team provides training and follow-up services at the family's or school's request.

VIII. The Core team provides a re-assessment at the family's or family's request.

Project TTAP: Technology Team Assessment Process

Individual Trial Form

To be completed by a Core Team Member or a member of the Child Support Team during the assessment activity.

Child's Name:_____ ID#____ Duration of Activity:_____

Observer: _____ Date of Assessment: _____

Software/toy Used: _____

Peripheral Device Used:

__ AFC	__ Muppet Learning Keys	__ Switch Interface Box
__ Keyboard	__ PowerPad	__ TouchWindow
__ KoalaPad	__ Switch	__ Unicorn
__ Mouse	__ Other: _____	

Switch Type: ___ in holder

__ ACTT Tread Switch	__ Membrane Switch
__ Big Red Switch	__ Music Switch
__ Flat White Switch	__ Plate Switch
__ Green Tape Switch	__ Pull Switch
__ Headband with Mercury Switch	__ String Switch
__ Jellybean Switch	__ Red Leaf Switch
__ Left/Right Rocker	__ Red Pillow
__ Light Switch	__ Zygo Tread Switch
__ L.T. Switch	
__ Other Switch: _____	

Switch Position:

__ Hand	__ Right	__ Left
__ Fingers	__ Right	__ Left
__ Head	__ Right	__ Left
__ Arm	__ Right	__ Left
__ Leg	__ Right	__ Left
__ Foot	__ Right	__ Left
__ Trunk		
__ Eyebrow		
__ Facial movement		
__ Other: _____		

Peripheral Placement:

__ Table	__ Right side	__ Left side	__ Midline
__ Floor	__ Right side	__ Left side	__ Midline
__ Wheelchair tray	__ Right side	__ Left side	__ Midline
__ Held by evaluator			
__ Mounted on wheelchair			
position:_____			
__ Mounted on monitor			

What Type of Computer Used:
___ Apple IIe ___ Macintosh LC
___ Apple IIGS ___ Other (describe): _____

Child's Position:
___ Adaptive chair ___ Seated on Floor
___ Chair ___ Wheelchair
___ Lying on Floor ___ Other _____

Other Equipment Used: _____

_____

Other Adaptations: _____

_____

Description of Activity: _____

_____

_____

Child's Reaction to Activity: _____

_____

_____

_____

_____

_____

_____

Observer's Comments: _____

_____

_____

_____

_____

_____

TTAP: Technology Team Assessment Process

TECH ACCESS
Technology Assessment for Computer Capability for the Education of Special Students

ID#: _____

Child's Name: _____

Date of Assessment: _____

Observer: _____

Directions: Use TECH ACCESS to record your observations of specific aspects of a child's ability to use various forms of input. This instrument does not measure a child's ability to use specific software. However any developmentally appropriate software can be integrated into the TECH ACCESS administration. TECH ACCESS may be completed during the assessment, immediately after the assessment or while viewing the assessment videotape. First complete the section on determining the reliable movement. Then continue to the desired input method which will be assessed first. TECH ACCESS does not need to be used sequentially; you may assess the three input methods in any order.

Check the most appropriate answer(s) for each item that applies to the child. R and L are designated for right and left. Check all items that apply. If an action or behavior does not occur, leave the item blank. Include comments where needed.

On the basis of the answers in Part I and the method of input selected, the observer completes the Part II Recommendations, checking answers that apply in that section and providing additional answers as needed. This information is used in writing the final report and making recommendations for the child and family.

TECH ACCESS contains the following:

TTAP: TechnologyTeam Assessment Process

TECH ACCESS
Technology Assessment for Computer Capability for the Education of Special Students

Part I: INPUT ASSESSMENT

RELIABLE MOVEMENT

Determine the reliable movement. Based on the answers selected for questions 1 - 11, continue with desired input method (switch, touch tablet, keyboard).

1. Reliable movement or control:

R L

__ __ Finger(s) 1 2 3 4 5*
__ __ Hand
__ __ Arm
__ __ Trunk: Right/Left side
__ __ Leg
__ __ Knee
__ __ Foot
__ __ Head: Right/Left side
    __ Chin
    __ Facial Feature/Mouth
    __ Other (describe):

*Throughout this form, the thumb is designated as 1, the index finger as 2, middle finger as 3, the ring finger as 4, and the little finger as 5

Based on areas checked previously, respond to the following:

Hand
2. With right/left hand, child can:

R   L

__ __ Squeeze and release
__ __ Squeeze, but not release
__ __ Press and release
__ __ Press, but not release
__ __ Wave hand back and forth
__ __ Pull
__ __ Move in up, down, right, & left
      directions
    __ Other (describe):

Arm
3. With right/left arm, child can:

R L

__ __ Press and lift
__ __ Press only
__ __ Lift only
__ __ Swing laterally
__ __ Swing vertically
__ __ Push forward
    __ Other (describe):

Comments:

Trunk
4. With trunk, child can:

R L

__ __ Press with ___ side
    __ Lean forward
    __ Lean backward
    __ Other (describe):

Comments:

Leg
5. With right/left leg, child can:

R L

__ __ Press toward ___ side
__ __ Squeeze right leg to left leg
__ __ Squeeze left leg to right leg
__ __ Lift leg
    __ Other (describe):

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Comments:

Foot
6. With **right/left** foot, child can:

R L

__ __ Press foot
__ __ Press right/left side
__ __ Lift front toes
__ __ Push heel
   __ Other (describe):

Comments:

Head
7. With **right/left** side of head, child can:

R L

__ __ Press switch
   __ Other (describe):

8. Child can:
   __ Raise head
   __ Lower head
   __ Other (describe):

9. Child can move head most comfortably:
   __ Tilt side to side
   __ Nodding (as in "yes")
   __ Turning (as in "no")
   __ Other (describe):

Comments:

Chin
10. With **chin**, child can:
   __ Press downward
   __ Other (describe)·

Comments:

Facial Feature/Mouth
11. Child can:

R L

__ __ Lift eyebrow
   __ Use tongue
   __ Sip
   __ Puff
   __ Other (describe):

Comments:

SINGLE SWITCH INPUT

If **SWITCH INPUT** is not appropriate for child, move to **TOUCH TABLETS**:

Motor Skills

12. Motor problems which make switch use difficult:
   __ None
   __ Slow motor response
   __ Too much concentration required for motor task
   __ Weak control of reliable movement
   __ Reflex movements interfere with appropriate switch use
   __ Tremor
   __ Half of response (e.g. press or release) is unreliable
   __ Other (describe):

Comments:

Cognitive Skills When Using A Switch

13. Child demonstrates understanding cause and effect concepts:
   __ Randomly presses switch with no apparent intent
   __ Presses switch with possible intent
   __ Presses switch with intent to cause battery operated device or computer program to operate
   __ Presses a switch with timer attached with intent to enjoy activity for 15 seconds or more
   __ Other (describe):

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TOUCH TABLET INPUT

If TOUCH TABLET INPUT is not appropriate for child, see SWITCH or KEYBOARD INPUT.

Physical Skills

19. Child can activate:
____ Entire touch tablet surface
____ Upper half of touch tablet
____ Right/left side of touch tablet
____ Lower half of touch tablet
____ Other (describe):

20. With right/left hand, child can use:
R   L
____ ____ Open hand with full finger usage
____ ____ One finger input 1   2   3   4   5
____ ____ Multi-finger   1   2   3   4   5
____ ____ Open hand; fingers move together as in scooping motion
____ ____ Open hand; palm usage only
____ ____ Clenched hand; palm usage
____ ____ Clenched hand; uses joints of bent fingers to operate tablet
____ Other (describe):

21. Child can:
____ Exert appropriate pressure to operate tablet
____ Exert pressure to operate tablet most of the time
____ Exert pressure to operate tablet some of the time
____ Not exert enough pressure to operate tablet
____ Other (describe):

Comments:

22. Motor problems which make touch tablet operation difficult:
____ None
____ Unable to lift hand off tablet after activating
____ Unable to exert enough pressure
____ Unable to reach to top of touch tablet
____ Unable to cross midline
____ Other (describe):

Perceptual Skills When Using a Touch Tablet

23. Visual discrimination:
____ Able to visually identify all activating areas
____ Able to visually identify limited activating areas
____ Able to identify and activate tactile overlay
____ Unable to identify activating areas
____ Other (describe):

24. Visual-motor processing:
____ Able to watch monitor while activating device
____ Need to concentrate on hand movement and pressing as device is being activated
____ Other (describe):

Comments:

Touch tablet input strengths:

Touch tablet input weaknesses:

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Recommendations
for
Keyboard Input

1. Potential assistive devices or materials to help with keyboarding:
   __ None
   __ Body restraint to stabilize hand
   __ Keyboard overlay or mask
   __ Finger mold (something attached to the hand like a pencil, pointer, or cast/mold with velcro)
   __ Moisture guard
   __ Keyguard
   __ Enlarged letter stickers on keys
   __ Tactile stickers on keys
   __ Other (describe):

2. Purpose of assistive device/material on the keyboard:
   __ Not applicable
   __ Stabilize finger, hand, or arm movement
   __ Enable child to press keys with a stylus via gripping motion
   __ Highlight operational keys either visually or tactilely
   __ Protect equipment
   __ Other (describe):

3. Outcome of assistive device/material use for the child:
   __ Normal keyboard operation
   __ Keyboard operation with operational keys marked or highlighted
   __ Restrict number of keys in operation
   __ Keyboard operation with overlay
   __ Limited keyboard operation
   __ Other (describe):

4. Placement and positioning of device/material:
   R L
   __ __ Palm of hand
   __ __ Wrist
        __ Not applicable
        __ Keyboard mount
        __ Table or tray mount
        __ Individual key mount (s)

5. Recommended device/material for keyboard input:

6. Assistive device/material source for keyboard input:
   a. Commercial (supply name, address, cost):

   b. Homemade (attach detailed schematics for device, drawings or descriptions):

   c. Other (describe):

7. Recommended activities for keyboard use:

8. Long term goals (activities) for keyboard as an input method:

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